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ABSTRACT

The Magnet Schools Assistance Program (MSAP) was designed to eliminate and prevent minority group isolation in targeted magnet schools in the Wake County (North Carolina) Public School System; this evaluation report examines factors that relate to achieving the MSAP goals and objectives. Parent survey data were used to determine whether increased technology use is likely to attract students not already enrolled in the MSAP schools; enrollment and application data were used to monitor success of MSAP related to recruiting new students; and achievement data, both for longitudinal cohorts and for MSAP schools overall, were used to measure effectiveness related to improved achievement for individual students and improved academic climates at MSAP schools. A summary covering the background, major findings, and recommendations, is included at the beginning of the report. The first section provides a program description, including a background and elementary and secondary school program components. In the second section, the evaluation design and methodology data sources are described. Findings are discussed in the third section, including technology use by classroom teachers, a teacher technology use survey, a parent survey, racial balance, and student achievement. Survey results are shown in 16 figures, and attachments provide a glossary of technology terms; a list of Enloe advanced courses; training dates for instructional technology resource teachers (1993-94); technology use data sheets; and the MSAP teacher survey and results. (AEF)

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EVALUATION REPORT: MAGNET SCHOOLS ASSISTANCE PROGRAM (MSAP)

June 1994

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Authors

Janet Johnson
Evaluation Consultant

Jan Donley
Evaluation Consultant

Contributing Staff

Nancy Baenen
Director, Evaluaton and Research

Kevin Gilleland
Data Analyst, Evaluation and Research

George M. (Buddy) West, Jr.
Evaluation Technician, Evaluation and Research

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EVALUATION REPORT
MAGNET SCHOOLS ASSISTANCE PROGRAM (MSAP)
1993-94

REPORT SUMMARY

Authors: Janet L. Johnson & Jan Donley

BACKGROUND

The federally-funded Magnet Schools Assistance Program (MSAP) was designed to eliminate and prevent minority group isolation in targeted magnet schools. Six Wake County Public School System (WCPSS) elementary schools are participating in MSAP: Poe, Conn, Powell, Bugg, Fuller, and Hunter, together with Ligon Middle and Enloe High Schools. When fully implemented, MSAP will include increased technology use by students and teachers in all curriculum areas. The objectives of MSAP include improving student achievement and reducing the gap between majority and minority achievement scores. If these program objectives are met, the improved academic climates and unique educational opportunities may attract more majority students to these magnet schools.

This evaluation examined factors that related to achieving the MSAP goals and objectives. Parent Survey data were used to examine whether increased technology use is likely to attract students not already enrolled in the MSAP schools; enrollment and application data were used to monitor success of MSAP related to recruiting new students; and achievement data, both for longitudinal cohorts and for MSAP schools overall, were used to measure effectiveness related to improved achievement for individual students and improved academic climates at MSAP schools.

MAJOR FINDINGS

IMPLEMENTATION

The grant provided each MSAP school with a full- or half-time Instructional Technology Resource Teacher (ITRT) to train and support classroom teachers to use computer labs more effectively, use technology within their curriculum areas, and use a variety of technological tools to meet the learning needs of diverse groups of students. The grant also provided funds for equipment, software, and training. The flexibility of the grant allowed each MSAP school to design and implement program components according to their individual needs and goals.

Based on ITRT quarterly implementation logs, the first semester was generally devoted to purchasing and installing equipment and software, and training staff to use computers and related technology. Initially, ITRTs in many of the schools worked to overcome problems with facilities relating to availability of electrical outlets, adequate space with proper lighting, and some security issues. They also spent time explaining the program and gaining support for MSAP from the staff in their schools. The second semester, ITRTs helped teachers use technology to develop lessons and provided demonstration classes

using model lessons. ITRTs also helped teachers make better use of computer labs in their schools.

Elementary Schools

By the second semester, more teachers were able to use MSAP resources effectively in their classrooms. **The number of lessons that elementary school teachers developed increased from 83 during the first semester (developed by 31 teachers) to 978 during the second semester (developed by 140 teachers in six elementary schools).** Almost half of these lessons were in language arts, about one-fifth were in mathematics, and most of the remaining lessons were in social studies and science. Most of the lessons were conducted with heterogenously grouped classes and very few teachers (5%) used a traditional lecture approach to instruction. Teachers increased their use of laser disc and CD-ROM technology in the second semester.

Middle School

At Ligon Middle School all students had increased access to computers through electives, and the ITRT targeted a 6th grade team for additional support and services. Teachers on this team received computers for their classrooms and training was designed to meet their needs. **The number of teachers who reported that they developed lessons using MSAP resources increased from 3 during the first semester to 17 during the second semester.** Teachers developed a total of 36 lessons and several of them were used more than once. Sixth-grade teachers, who were targeted for extra support, developed slightly more than half of these lessons. The greatest percentage of middle school lessons (41%) were in social studies, using primarily Macintosh computers, laser discs, and word processors.

High School

At Enloe High School the ITRT developed a Communications Lab with Macintosh computers for use in English, social studies, and vocational areas. A Math Lab was established with IBM computers which will be networked to mathematics classrooms in 1994-95. These labs were not operational until the fourth quarter. **During the second semester, a total of 29 teachers at Enloe reported that they developed and used 68 lessons with MSAP resources.** The greatest percentages of these lessons were in English (34.9%) and science (25.3%); very few (8%) of the lessons were designed for a lecture approach of instruction.

In addition, the ITRT and administrators identified 10th and 11th grade students who scored above the 80th percentile on any End-of-Course tests and classroom teachers identified other students with potential to enroll in advanced level courses. Teachers of average classes in which these students were enrolled were encouraged to use the Communications and Math Labs in 1993-94, and these students were counseled to enroll in advanced classes. These students will receive additional services to encourage and support them as they participate in advanced classes in 1994-95 in which they otherwise would not have enrolled.

TEACHER USE OF AND ATTITUDES TOWARD TECHNOLOGY

The ITRTs surveyed teachers in their schools in fall 1993 and spring 1994 to determine their attitudes toward using technology, levels of experience, and training needs. Fall survey results indicated that the majority of teachers at all levels believed technology use would enhance education, but they had little experience using technology. **In the spring,**

teachers reported more favorable attitudes toward instructional technology, and that they had more experience using a variety of technological tools in their classrooms. The most significant increases in reported technology use were:

- word processors (from 20% to 59% at MSAP elementary schools, 36% to 54% at Ligon, and 58% to 70% at Enloe);
- graphics software at the MSAP elementary schools (from 9% to 23%);
- laser discs at elementary schools (from 3% to 16%); and
- CD-ROMs at elementary schools (from 5% to 26%).

The percent of teachers who reported having access to a computer for classroom instruction increased at MSAP elementary schools (from 38% to 61%) and Ligon (63% to 73%), while this percentage was nearly unchanged at Enloe. The percent of teachers who reported receiving technical assistance when they needed it increased at the MSAP elementary schools (from 69% to 83%) and Ligon (from 53% to 71%) and slightly decreased at Enloe (from 56% to 53%). The greatest change in attitude was reported at Ligon, where the percent of teachers who believed computers will change the way their subject is taught increased from 58% in the fall to 76% in the spring.

PARENTS' ATTITUDES TOWARD TECHNOLOGY

One goal of MSAP was, with the use of additional technology, to make the targeted schools more attractive to Wake County parents who have the option of applying to send their children to these magnet schools in order to reduce or prevent minority group isolation. The WCPSS administered an annual survey to all parents in November 1993, which served as an indicator of parents' perceptions before MSAP. This evaluation compared responses to technology-related questions for MSAP schools with non-MSAP schools. Baseline Parent Survey results indicated:

- The vast majority of parents at MSAP and non-MSAP schools (approximately 80% at all grade levels) believed that using computers and related technology help prepare their children for the future.
- Almost no difference existed between MSAP and non-MSAP schools regarding parents' perceptions of their children's computer use at school. There were differences across grade levels, however. About one-third of middle school parents and one-half of high school parents did not believe that their children use a computer at school. This perception was not true for either MSAP or non-MSAP elementary schools, where a vast majority (80%) of parents reported that their children were using computers at school.
- Although many parents reported that their children were using computers in school, far fewer MSAP and non-MSAP parents at all grade levels were pleased with the way their children were using computers in school.

It is clear that parents at the secondary level do not believe that their children use computers at school, and at all levels parents are generally not satisfied with their children's use of computers at school. **These baseline findings indicated that the MSAP program can be an effective component of recruiting efforts to attract new applicants.**

RACIAL BALANCE WITHIN MSAP SCHOOLS

A primary MSAP goal was to expand and revitalize targeted magnet school programs by eliminating and preventing minority group isolation. The schools targeted by this grant were in danger of becoming racially isolated. The district's racial composition guideline is no more than 45% minority enrollment. All MSAP schools failed to meet this guideline in 1992-93, and Enloe High (50% minority) and Poe Elementary (51% minority) were considered racially isolated. The other MSAP schools had slightly under 50% minority enrollment. The actual 1994-95 enrollment data cannot be determined until fall 1994; however, preliminary data indicate that six of the eight MSAP schools are projected to have a decrease in the percentage of minority students who will enroll in 1994-95. **Therefore, preliminary data suggest that progress has been made towards the goal of eliminating or preventing minority group isolation.**

STUDENT ACHIEVEMENT

Longitudinal Cohort Baseline Data

To gauge the long-term impact of MSAP, End-of-Grade (EOG) mathematics and reading achievement data were collected for 4th grade students at MSAP elementary schools and for a team of 6th grade students who received additional services at Ligon Middle School. The progress of these 1993-94 4th and 6th graders was monitored. The evaluation plan was to compare the percents of the majority and minority students scoring at each of levels I - IV on EOG tests in mathematics and reading for 1992-93 (baseline) and 1993-94. Data regarding the percentage of students scoring at each level on mathematics and reading EOG tests were not available for the 1993-94 school year when this report was completed. Baseline data for the longitudinal cohorts served are described later in this report, and 1993-94 follow-up data will be included in the final report. **Baseline data reveal that a large discrepancy exists between majority and minority EOG performance for the longitudinal cohorts at all schools.**

The evaluator identified a comparison group of students (10th and 11th grade minority students at Enloe in 1991-92 who scored above the 80th percentile on any of the 1990-91 End-of-Course tests) to help determine the impact of the MSAP program on minority student participation and success in advanced courses. For the purposes of this report, only comparison-group data regarding the number of advanced courses taken and successfully completed will be described, because data were not yet available for the targeted MSAP group of students. **This baseline data showed that high-ability minority students in the comparison group successfully completed an average of about one or fewer advanced courses per subject area.**

Overall School Achievement

MSAP resources may have impacted overall academic climates at MSAP schools; therefore, overall school EOG achievement data were also examined. The evaluation examined the EOG mathematics and reading scores for the MSAP elementary and middle schools, compared with WCPSS scores. The evaluation also reported the gap between the percent of majority and minority students at or above Level III, which indicates proficiency at grade level, in mathematics and reading for MSAP schools, as this also affects perceptions regarding school climate. The data were only available for 1992-93 (baseline) when this report was completed, but results for 1993-94 will be included in the final report and used to compare with baseline data. **Baseline data indicate that a large discrepancy exists between majority and minority EOG performance for all grades at all schools.**

RECOMMENDATIONS

ITRTs should explore ways for teachers to more frequently use MSAP resources other than word processors. Some teachers have already developed lessons using CD-ROMs, laser discs, and other types of software. ITRTs may facilitate teachers sharing lessons they have developed. Also, ITRTs can help teachers make use of the Internet to gain access to and share lesson plans that use a variety of technologies. Teachers from all over the United States are currently sharing lessons using technology via the Internet.

Many teachers reported needing support in their classes when implementing lessons that used technology because lessons were more individualized than teachers were accustomed to. All ITRTs provided support to teachers who needed it, but as technology use increases, parent volunteers may help alleviate this need. One MSAP elementary school reported that they successfully used parent volunteers in 1993-94.

Recruitment strategies to attract more majority students should be increased for next year. Recruitment plans for 1994-95 include public relations events to inform parents about the MSAP program. Efforts will include open houses, news stories, and public displays of student work that was completed using MSAP technologies, accompanied by descriptions of the program.

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PROGRAM DESCRIPTION

BACKGROUND

In 1993-94, the Magnet Schools Assistance Program (MSAP) was in the first year of implementation at six elementary, one middle, and one high school: Poe, Conn, Powell, Bugg, Fuller, Hunter, Ligon Middle School, and Enloe High School. The primary goal of MSAP was to reduce or prevent minority group isolation by making the targeted schools more attractive to Wake County parents who have the option of applying to send their children to these magnet schools. The objectives for meeting this goal included raising schools' End-of-Grade (EOG) mathematics and reading scores if below Wake County Public School System (WCPSS) averages, and reducing the gap between majority and minority scores. The strategies for meeting these objectives were to provide increased technology for use in core courses, train teachers to use the technology, and support them as they began to integrate technology into classroom lessons. These strategies were chosen because increased technology use would allow schools to offer more unique programs, and permit teachers to better individualize lessons by using alternative teaching methods to meet the learning styles of diverse groups of students.

Technology use allows teachers to employ a greater variety of teaching methods than those that have become the norm (e.g., lecturing and worksheet completion), which may facilitate learning in all subjects. Educational research provides evidence that non-white students exhibit field-dependent learning styles and are more motivated to succeed in cooperative rather than competitive learning environments (Shade, 1982; Stiff, 1990). In addition to helping reduce the gap between minority and majority achievement, the use of technology in the classroom may permit increased use of cooperative learning activities. For example, when technology is used for computing in mathematics classes, the focus of the class moves toward applications, contexts, relationships, problem solving and decision making--activities which are conducive to cooperative learning efforts. If teachers have to model how to do computations using lecture-style instruction, little or no time is left for cooperative group work (National Council of Teachers of Mathematics, 1989). Thüs, technology use may help reduce the gap between minority and majority achievement.

THE ROLE OF THE ITRT

All participating schools integrated technology through core and elective courses with support from an Instructional Technology Resource Teacher (ITRT). This position allowed an increased level of individualization of services to students. The ITRT at each school conducted training in a variety of areas: for example, they frequently provided basic computer and keyboarding training to staff and students, and trained staff and students to use a variety of software packages. The ITRTs worked directly with students in classrooms when teachers needed support to successfully implement lessons they developed that used technology.

All ITRTs received training in 1993-94 in the areas of hardware setup, software evaluation and use, telecommunications and use of multimedia workstations. A complete list of ITRT training can be found in Attachment 3.

PROGRAM COMPONENTS

Each school designed program components to meet their individual needs. Individual school plans are summarized in the evaluation design for this project (WCPSS Evaluation and Research Report #94.07P). The MSAP staff plans to have all components implemented by the end of the 1994-95 school year. A description of the components that were implemented at each school during 1993-94 is provided below. A glossary which contains a brief explanation of some technology terms and software packages frequently used by schools is located in Attachment 1.

ELEMENTARY SCHOOLS COMPONENTS

Bugg Elementary

Students in grades 2-5 at Bugg Elementary received instruction in both a Mathematics Lab (using IBM computers and Jostens software), and a Communications Center (using Macintosh computers, with The Writing Center and KidWorks software). Students in grades 4 and 5 used the PAWS keyboarding program. Additionally, 36 highly able 3rd, 4th, and 5th grade students who were not state-identified AG received Higher Order Thinking Skills (HOTS) instruction, and 5th grade students learned to use telecommunications software. Students in all grades received science instruction via outdoor weather stations and Windows on Science software. Students in grades K-5 also participated in a Talents Unlimited program, which involved integrating the HOTS program into the curriculum using a team teaching method. Students in grades K-2 also used The Graph Club software, a program designed to get students to read, interpret, and create graphs.

Poe Elementary

The MSAP program at Poe Elementary in 1993-94 focused on improving student achievement through the integration of technology into the core curriculum of regular classrooms. To achieve this goal, students in grades 3-5 had access to Macintosh computers in a lab and in classrooms for communicating (word processing and multimedia presentations) and manipulating information (databases and spreadsheets). The software packages used included HyperStudio, a multimedia authoring system, and ClarisWorks, an integrated word-processing package. The ITRT worked with 4th and 5th grade teachers by demonstrating model lessons which integrated technology into the regular curriculum. An additional component of the program was access to the world through telecommunications, both as a means of accessing information and as a means of communicating with others. Teachers received training in the Internet telecommunications system, and this program component will be implemented for students in 1994-95. Many of the technology components also will be extended next year to include students in grades K-2.

Conn Elementary

MSAP implementation at Conn involved Macintosh computers, with on-line tutorials and training to show teachers how to use the Macintosh and ClarisWorks. Students in all grades learned word-processing skills, used mathematics and writing software and were taught reading using CD-ROM technology. Students in grades K-2 learned creative writing and drawing through the Kidworks software package, and used laser disc science software at a multimedia workstation. Students in grades 3-5 improved their thinking and writing skills by using laser disc technology for social studies, geography and science; also, students worked to publish a school newspaper using The Writing Center software, which

emphasized writing skills by developing paragraphs and improving vocabulary. Some students at these grade levels also participated in a telecommunications elective, which emphasized improving writing skills, organizing, thinking, and communicating.

Fuller Elementary

Fuller Elementary established both a small computer lab as a Writing and Publishing Center, and a large lab to house computers and software designed to give students extra help with reading, writing, and mathematics. ClarisWorks was used for students in grades 3-5 for word processing, drawing, and painting. Students in grades K-2 used Kidworks, a word-processing software. Students at all grade levels used CD-ROM technology, including CD-ROM interactive storybooks, and CD-ROM research materials in the Writing and Publishing Center. Parent volunteers worked in the Writing and Publishing Center during school hours, and all volunteers received computer training. Several technology elective classes were offered, including telecommunications and video production courses. Fuller also improved its arts program by establishing student Arts Clubs in the areas of art, music, dance, drama and technology; this resulted in an increased number of students enrolled in arts production electives. Initial preparations were begun in the school Media Center to include a Research Center which next year will contain research materials and have telecommunications capabilities.

Hunter Elementary

Hunter Elementary set up a fully integrated networked Macintosh learning lab with state-of-the-art technology to provide all students with unique, interactive activities designed to meet individual needs in reading, mathematics, science, and social studies. Students in grades 3-5 received instruction in keyboarding and word processing, and used laser discs, CD-ROMs, and a variety of educational software. Students at all grade levels used the Windows on Science software to supplement their science curriculum. Several Macintosh computers with CD-ROM players were used as portable workstations for students and teachers; CD-ROMs used included a Multimedia Encyclopedia and a World Atlas. A new technology elective was offered for 4th and 5th grade AG students, "Personal Publishing," and new technology electives were developed for 1994-95 to promote achievement among all students.

Powell Elementary

Students in grades 3-5 at Powell Elementary received instruction in reading and writing in a Macintosh computer lab and used ClarisWorks for word processing software. This lab also contained multimedia, CD-ROM, networking, and laser disc technologies. Students in grades 4-5 received intensive training in keyboarding skills using the PAWS software program. Teachers at Powell also used Windows on Science, a science software program designed to enhance science learning. Another major emphasis for students in grades 3-5 was Lego/Logo robotics and programming which encouraged higher order thinking skills for students in elective classes. Several other enhanced-technology electives were offered, including Introduction to Microcomputers, a class in which kindergarten students used several software programs including: 1) Playroom, a program that offers a variety of instructional games in communication, mathematics and computer skills; 2) KidWorks; 3) KidPix, a program that allows students to create graphics on the computer; and, 4) a variety of interactive CD-ROM stories. Students in grades one and two also used LogoWriter software.

MIDDLE AND HIGH SCHOOL COMPONENTS

Ligon Middle School

Ligon Middle School established a Humanities Lab which housed Macintosh computers and SimCity, Superpaint, Timeliner, HyperStudio, MacGlobe, and ClarisWorks software. Ligon also used technology to integrate the arts and the classroom instruction of language arts, social studies, mathematics, and science. Several new electives were developed, including Computer Music and Hypermedia. A 6th grade team of students was targeted to receive additional services, and had access to four computers in each class, for a total of 16 computers which were networked to a file server. Teachers on this 6th grade team planned interdisciplinary units, used the computers for writing, and helped children develop multimedia projects. This approach was intended to be a model from which ideas will be gained for expanding the services for these same students in 1994-95.

Enloe High School

Enloe High School developed a fully equipped Communications Lab with Macintosh computers for instruction in English, social studies, and vocational areas, and a Math Lab with IBM computers that will be networked to mathematics classrooms in 1994-95. These labs were not operational until the fourth quarter. Several Paideia workstations with laser disc and CD-ROM technology were created and used by social studies and English classes. Science multimedia workstations were also established, which contained Vernier probe software and science laser discs. A "Principles of Technology" vocational program was planned for 1994-95 which will use technology to teach mathematics and science courses to vocational-education students. In addition, pre-engineering computers and equipment were installed for a course for students planning careers in engineering.

The ITRT identified 1993-94 10th and 11th grade students who scored above the 80th percentile on any 1992-93 End-of-Course tests, and classroom teachers selected additional students with potential to enroll in advanced classes. Teachers of average classes in which these students were enrolled were encouraged to use the Communications and Math Labs in 1993-94, and these students were encouraged to enroll in advanced classes. These students will receive additional counseling and support services to encourage them to enroll and help them succeed in advanced classes in 1994-95. Some of these students will also participate in a mathematics enrichment course during summer 1994, which is designed to prepare them to complete successfully advanced math classes in the following school year.

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EVALUATION DESIGN AND METHODOLOGY

An independent consultant evaluated the Magnet Schools Assistance Program (MSAP) in 1993-94, with assistance from the department of Evaluation and Research. The evaluator focused on the goal and objectives of the MSAP program: (1) the elimination and prevention of minority group isolation; (2) reduced achievement gaps between majority and minority students, and (3) increased achievement for all students. The strategies for accomplishing these goals were to train teachers to use technology in core courses, provide technology expertise to support them, and provide the appropriate technology. The evaluator collected and analyzed data related to these goals, and summarized implementation data. The implementation data included: a teacher survey which addressed teachers' use of and attitudes towards technology before MSAP and after one school year of MSAP, quarterly logs from ITRTs which summarized the extent of program implementation at each site, and data on actual use of MSAP resources by classroom teachers at their schools.

General questions the evaluation addressed were:

- To what extent was MSAP implemented in each school?
- How did teachers' use of and attitudes towards technology change across the school year?
- What were parents' attitudes about technology use in schools?
- Did MSAP affect the racial balance within schools?
- What impact did MSAP have on academic performance and achievement for the grant schools and for a cohort of students followed over time?

DATA SOURCES

IMPLEMENTATION LOGS AND TECHNOLOGY USE DATA

The ITRTs kept logs and reported each semester to describe program implementation in their schools. The evaluators used data from these logs to describe the implementation process in each MSAP school. Program staff visited each school and reported program implementation they observed. Data were also collected regarding core-subject teachers' technology use. These data provided an indication of how teachers used MSAP resources, whether they considered the lessons successful, and what kind of technical support and training they required.

TEACHER TECHNOLOGY USE SURVEY

All teachers were surveyed in MSAP schools in fall 1993 and spring 1994 to determine their classroom technology use, personal technology use, and attitudes toward using technology. ITRTs administered the pre-survey to teachers during a faculty meeting in October 1993, and administered the post-survey at a faculty meeting in May 1994. Results were analyzed separately for MSAP elementary schools as a group, Ligon Middle School, and Enloe High School. The return rates for the pre-survey were 86% for elementary

schools, 84% for Ligon, and 86% for Enloe. The return rates for the post-survey were 80% for elementary, 84% for Ligon, and 86% for Enloe. This survey will be given again in spring 1995 to determine changes in teachers' perceptions following the second year of MSAP implementation.

PARENT SURVEY

The WCPSS Evaluation & Research Department administered a survey to all parents in November 1993, and this survey is given once every school year. The return rate for the Parent Survey was 49%. Several survey questions dealt with the role of technology in education. The evaluation compared answers to technology-related questions for MSAP schools with non-MSAP schools for elementary, middle, and high school levels. The 1993 Parent Survey served as baseline data, and will be compared to data from the 1994 Parent Survey in the final evaluation report.

RACIAL BALANCE

The magnet program in WCPSS is part of the district's effort to maintain racial balance in its schools. Many programs that once were unique to the magnet schools have been replicated in other schools, diminishing their attractiveness. The schools targeted by this grant were in danger of becoming racially isolated. Poe Elementary was already considered racially isolated in 1992-93, with 51% of the student body being minority. The other schools had slightly under 50% minority enrollment. The evaluation monitored progress of all MSAP schools toward the districts' racial composition guideline of no more than 45% minority enrollment.

STUDENT ACHIEVEMENT

Longitudinal Cohorts

Elementary Schools The evaluation was designed to monitor from 1992-93 until 1994-95 the progress of the 1993-94 4th graders at MSAP elementary schools and compare the percents of the majority and minority students scoring at each of levels I - IV on End-of-Grade (EOG) tests in mathematics and reading. The 3rd grade 1992-93 Mathematics and Reading EOG scores for this cohort served as baseline data. This year the evaluation intended to compare these students' baseline scores with their 1993-94 scores to track progress toward the goal of reducing by 8% the gap between the percentage of majority and minority students at or above Level III on EOG tests in mathematics and reading. However, 1993-94 EOG data were not available at the time of the completion of this report, and therefore these results will be included in the final report.

Middle School At Ligon Middle School, one 6th grade team of teachers and students was targeted for direct services during 1993-94. These teachers received MSAP resources for their classrooms, technology training, and support from the ITRT. The 1993-94 6th grade students who were directly served will remain together and will be served on one seventh grade team in 1994-95. The evaluation will track from 1992-93 until 1994-95 the achievement of this cohort of 6th graders and compare the percents of the majority and minority students scoring at each of levels I - IV on EOG tests in mathematics and reading. The 5th grade 1992-93 Mathematics and Reading EOG scores for this cohort served as baseline data. This year the evaluation will compare (when data becomes available) these students' baseline scores with their 1993-94 scores to track progress toward the goal of reducing by 8%, the gap between the percentage of majority and minority students at or above Level III as measured by the N.C. End-of-Grade reading and mathematics tests.

High School Enloe planned to increase the number of minority students who enrolled in and successfully completed advanced courses. The ITRT and administrative staff identified 1993-94 10th and 11th grade minority students who scored above the 80th percentile on any of the 1992-93 End-of-Course tests, or who were recommended as having the potential to suceed in advanced courses by classroom teachers. This targeted group of students were counseled to enroll in advanced courses, and teachers of average classes in which these students were enrolled in 1993-94 were encouraged to frequently use the Communications and Math labs so that these students would have access to technology. The selected minority students will again be encouraged to enroll in advanced courses in 1994-95, and will be given support to succeed in these courses. Some of these students will also participate in a summer mathematics enrichment class to prepare them to successfully take advanced mathematics courses in fall 1994.

The evaluator identified a comparison group of 1991-92 10th and 11th grade minority students at Enloe who scored above the 80th percentile on any of the 1990-91 End-of-Course tests. Following the 1994-95 school year, the evaluation will compare for the MSAP-targeted and comparison groups, the average number of advanced English, social studies, mathematics, and science courses successfully completed with a C or better. The 1993-94 school year data will serve as baseline information, and the evaluation will monitor progress toward the goal of an 8% greater increase in the average number of advanced courses completed with a C or better as compared with the control group. For the purposes of this report, comparison-group data only will be described because baseline data was not yet available for the targeted MSAP group of students.

Overall School Achievement

All students in MSAP schools at least indirectly benefited from MSAP resources, and the schools' teaching and learning climates may have been impacted. School achievement data may be affected both through the scores for students served by MSAP resources and achievement levels of newly enrolled students. The resulting school achievement data is a factor in school climate that influences whether parents elect to enroll their children in these schools. The evaluation will examine (when data become available) the 1993-94 EOG mathematics and reading scores for the MSAP elementary and middle schools, compared with WCPSS scores. Schools with less than the district percentages of students at or above Level III in reading or mathematics will be monitored for progress toward the goal of an 8% reduction in this difference. The evaluation also will report the gap between the percent of majority and minority students at or above Level III in mathematics and reading for the MSAP schools, as this also affects perceptions regarding school climate. Baseline (1992-93) data will be described for purposes of this report.

FINDINGS

CLASSROOM TEACHERS' TECHNOLOGY USE

Data were collected from classroom teachers regarding program implementation. Classroom teachers completed Technology Use Data Sheets when they used MSAP resources (see Attachment 4). On the Technology Use Data Sheets, teachers described lessons in which they used technology, rated the difficulty of implementing the lessons, and rated the lessons' effectiveness. This information provided a thorough description of how the MSAP grant was operationalized by teachers at each school to serve students in core courses.

Teachers also indicated on the questionnaires whether lessons were used multiple times. The ITRTs reported that classroom teachers occasionally used MSAP resources without completing questionnaires, so this data may be slightly incomplete.

The increase in the number of MSAP resources used by classroom teachers from the first to second semester reflects the fact that ITRTs spent more time during the first semester introducing the program, ordering and installing equipment, and providing training for teachers. The data are summarized below for elementary, middle and high schools.

ELEMENTARY SCHOOLS

Teachers at MSAP elementary schools developed a total of 1,061 lessons in 1993-94. The number of lessons developed increased dramatically from the first to the second semester, with 83 lessons developed during the first semester, and 978 developed during the second semester. The total number of teachers who reported using MSAP resources at the elementary level also increased substantially, with 31 teachers using MSAP resources during the first semester, and 140 using MSAP resources during the second semester.

Curriculum Areas

Figure 1 shows the percentage of lessons teachers developed in each curriculum area at each grade level during 1993-94. These data indicate that MSAP resources were most frequently used for language arts instruction at all grades. Students at grades 3 and 5 were the most frequent participants in teachers' use of MSAP resources.

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Figure 1. Percentage of MSAP Lessons Developed by Elementary School Teachers, by Content Area and Grade Level, 1993-94 (n=1,061 and 21% of these lessons were used more than once)

	Math	Reading/ L.A.	Science	Social Studies	Art	Music	Other	Total
K	3.4%	5.4%	0.3%	0.1%	0.0%	0.0%	1.6%	10.7%
1	1.9%	7.4%	0.7%	0.0%	0.0%	0.0%	1.4%	11.3%
2	2.1%	8.9%	1.4%	0.4%	0.1%	0.0%	1.5%	14.3%
3	6.4%	12.1%	2.3%	0.4%	0.0%	0.0%	2.3%	23.4%
4	3.8%	7.1%	0.9%	2.1%	0.0%	0.0%	2.0%	15.8%
5	4.2%	6.6%	5.0%	6.5%	0.0%	0.1%	2.0%	24.4%
Total	21.8%	47.3%	10.6%	9.4%	.10%	.10%	10.7%	100%

Lesson Context

A majority (62%) of the lessons developed by teachers at elementary schools were used with class sizes of more than 20 students. Most (79%) of these lessons were conducted with heterogeneous groups of students, while 15% involved gifted students, and 6% targeted remedial students (including special education students). About half of the lessons developed were for single subject and half for interdisciplinary instruction. Slightly more than half (55%) were intended to supplement or enrich the curriculum rather than simply cover the regular curriculum. Very few (5%) lessons incorporated a lecture approach to instruction; the remainder involved either cooperative learning (15%), projects (17%), lab (48%), or a combination of approaches (14%). A majority (65%) of the lessons required less than 15 minutes to develop, and most (74%) were an adaptation of an existing lesson to integrate technology rather than the creation of a new lesson.

MSAP Resources Used

Figure 2 shows the percentages of MSAP teacher-developed lessons that used each type of resource. Teachers reported using the Macintosh computer most frequently at MSAP elementary schools, but a fairly substantial (19%) percentage reported using some "other" computer, most typically an Apple IIE. These data suggest that many teachers are not yet comfortable using additional hardware equipment, other than printers. However, use of these types of hardware increased from first semester to second semester, as more teachers began using CD-ROM and laser disc technology. Word-processing software was the most frequently used software tool. Very few teachers used spreadsheets, and some teachers requested additional training and help developing these types of lessons. A majority of lessons involved use of some type of educational software. Examples of educational software include TurboMath, SimCity, and Reader Rabbit.

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Figure 2. Percentage of Lessons that Used Each MSAP Resource at Elementary Schools, 1993-94

Computer Hardware (N=991)	
Macintosh	79%
IBM	1%
Other	19%
Other Hardware (N=607)	
Laser disc	5%
Scanner	0%
Modem	2%
Printer	75%
Fax	0%
CD-ROM	11%
LCD Panel	5%
Multimedia Station	1%
Robotics	0%
Video Production Equipment	1%
Software (N=1047)	
Word-processing	40%
Spreadsheet	1%
Educational Software	58%
E-Mail	1%

Difficulty and Effectiveness of Lessons

Almost all teachers (96%) at elementary schools reported that the lessons were not difficult to implement. Teachers were very positive about the effectiveness of their lessons, with 82% reporting that the lessons were effective. Some insights that classroom teachers at elementary schools wished to share with others regarding the difficulty and/or effectiveness of the lessons they developed were:

- During the first semester, many teachers reported that they did not realize they needed to budget more time than normal at the end of lessons so students could save their work, shut down computers, and organize paper work.

- Students working at their own pace on projects often had individual questions or computer problems for which they needed help. Teachers reported needing another person to help answer questions in this type of setting. (One school used parent volunteers to help and ITRTs helped in all the schools.)

- Teachers reported that students were motivated by the idea of being recorded with a camcorder when reading their own poetry and of having their work published and compiled into a class book.

- Several teachers indicated that educational software was a great way to supplement regular classroom instruction for students who needed to practice a variety of mathematics skills.

- One teacher wrote, "With little guidance, first graders were able to log in, type, save, and print their work using KidWorks software and working in pairs."

- Another teacher reported, "Students were more motivated to find and correct their grammar and spelling errors on the computer before printing final papers than they usually are when they hand write papers. It was much easier for them to correct mistakes without having to recopy a paper. The quality of their work was higher because rewriting and reorganizing their work was much easier on the computer."

MIDDLE SCHOOL

Three teachers at Ligon Middle reported developing lessons using MSAP resources during the first semester, and this number increased to 17 during the second semester of 1993-94. These teachers developed 36 lessons, and 17% of these lessons were used by teachers more than one time.

Curriculum Areas

Figure 3 provides data on the grade level and subject area of these lessons.

Figure 3. Percentage of MSAP Lessons Developed by Middle School Teachers, by Content Area and Grade Level, for 1993-94 (n= 36 and 17% of these lessons were used more than once)

	Math	Reading/ L.A.	Science	Social Studies	Art	Music	Other	Total
6	2.2%	10.8%	10.8%	21.7%	0.0%	2.2%	6.5%	54.2%
7	0.0%	2.2%	2.2%	8.8%	0.0%	2.2%	6.5%	21.9%
8	0.0%	2.2%	4.3%	10.8%	2.2%	2.2%	2.2%	23.9%
Total	2.2%	15.2%	17.3%	41.3%	2.2%	6.6%	15.2%	100%

These data suggest that a majority (54%) of the lessons were developed for 6th grade students, which is not surprising given that a 6th grade team of students was targeted for services. Most of the lessons (41%) were developed for instruction in social studies, followed by science, reading/language arts, and "other," which primarily involved lessons on how to use the technology in isolation from the regular curriculum (e.g., keyboarding skills).

Lesson Context

Most (63%) of the lessons developed by teachers at Ligon were used with class sizes of fewer than 20 students. Almost three-quarters (74%) of these lessons were taught to heterogeneous groups of students, while 24% were designed for gifted students, and 3% targeted remedial students (including special education students). The percentage of single-

subject compared with interdisciplinary lessons were fairly equivalent, with 54% and 46% of lessons being developed for single subject and interdisciplinary instruction, respectively. One-half of the lessons were intended to supplement or enrich the curriculum, and one-half were designed to cover the regular curriculum. Very few (10%) lessons used a lecture approach; the remainder involved using either cooperative learning (26%), projects (15%), lab (26%), or a combination of approaches (23%). A majority (73%) of the lessons took less than one hour to design, but only slightly more than one-half (52%) involved adapting an existing lesson rather than creating a new one.

MSAP Resources Used

Figure 4 provides information on the types of MSAP resources which were used by Ligon teachers during 1993-94.

Figure 4. Percentage of Lessons that Used Each MSAP Resource at Ligon Middle School, 1993-94

Computer Hardware (N=30)	
Macintosh	100%
IBM	0%
Other	0%
Other Hardware (N=23)	
Laser disc	26%
Scanner	17%
Modem	0%
Printer	35%
Fax	0%
CD-ROM	5%
LCD Panel	9%
Multimedia Station	4%
Robotics	0%
Video Production Equipment	4%
Software (N=39)	
Word-processing	33%
Spreadsheet	8%
Educational Software	59%
E-Mail	0%

All of the lessons developed by teachers at Ligon involved use of a Macintosh computer, and teachers reported using printers, laser disc, and scanner technology (a hardware tool which "reads" information, e.g., text from a book, into a computer file) for their lessons. One-third of the lessons involved word-processing software, and a majority of the lessons involved some type of educational software. Examples of educational software used include Maps and Navigation (designed to teach map reading skills), HyperStudio (an authoring tool that allowed students to create a multimedia presentation on the fall of Troy), and MacGlobe (used to teach Russian geography skills to students)

Difficulty and Effectiveness of Lessons

A vast majority (79%) of teachers at Ligon reported that the lessons they used were easy to implement. Teachers were overwhelmingly positive about the effectiveness of their

lessons, with 95% reporting that the lessons were effective. Some insights that classroom teachers at Ligon wished to share with others regarding the difficulty and/or effectiveness of the lessons they developed were:

- Regarding students using HyperCard and scanning software on a Macintosh to create stacks relating to literature: "This was very good for students learning to organize things sequentially. I enjoyed learning right along with the students. Students could be as simple or as detailed as they wanted. Students got so 'into it' that it took longer to complete than anticipated."

- Regarding students using HyperStudio to create a presentation on Book II of The Aenead for a Latin class which will be used to introduce the material to another Latin class: "This motivated a very negative, non-participatory group of students!"

- Regarding use of a spreadsheet to teach graphing in a math class: "The spreadsheet made changing graphs with the same data very easy and quick for students (e.g., interchanging line, bar, and circle graphs using the same data)."

HIGH SCHOOL

During the first semester, high school teachers did not report using MSAP resources in their subjects. The ITRT spent the first semester identifying students to target, ordering and installing equipment, and trying to interest teachers in the program. Teachers developed lessons using MSAP resources during the second semester and completed Technology Use Data Sheets to describe them. A total of 29 teachers at Enloe reported using MSAP resources for 1993-94. A summary of the information they provided follows.

Curriculum Areas

During the second semester, teachers reported using or developing a total of 68 lessons. Grade level and subject area breakdown of lessons are provided in Figure 5.

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Figure 5. Percentage of MSAP Lessons Developed by High School Teachers, by Content Area and Grade Level, for 1993-94 (n=68 lessons, and 26% of these lessons were used more than once)

	Math	Reading/ L.A.	Science	Social Studies	Art	Music	Other	Total
9	1.3%	13.6%	9.1%	0%	1.3%	0%	4.6%	29.8%
10	1.3%	12.9%	5.2%	2.6%	1.3%	0%	6.6%	29.9%
11	2.6%	5.2%	5.8%	.6%	1.3%	0%	6.6%	22.1%
12	1.3%	3.2%	5.2%	0%	1.3%	0%	7.1%	18.2%
Total	6.5%	34.9%	25.3%	3.2%	5.2%	0%	24.9%	100%

Approximately 60% of the students receiving lessons using MSAP technology were in grades 9 or 10, and most of the lessons were in the subject areas of reading and science, or classified as "other." These "other" lessons often involved teaching students to use the technology; for example, many students received instruction in how to use a word-processing program. Several of the "other" lessons were conducted within the Pre-Engineering program.

Lesson Context

A majority (79%) of the lessons developed by teachers at Enloe were used with class sizes of fewer than 20 students. Most (59%) of these lessons were conducted with heterogeneous groups of students, while 30% involved gifted students, and 10% involved remedial students (including special education students). A majority (68%) of the lessons developed were for single subject rather than interdisciplinary instruction, and most (65%) were intended to supplement or enrich the curriculum rather than simply cover the regular curriculum. Very few (8%) of the lessons used a lecture approach; the remainder involved either cooperative learning (23%), projects (27%), lab (28%), or a combination of approaches (15%). Almost one-half (49%) of the lessons took one hour or more to develop, and a majority (62%) were adaptations of an existing lesson to integrate technology rather than newly created lessons.

MSAP Resources Used

Teachers did not begin using MSAP resources at Enloe High until the second semester, so the data in Figure 6 reflect only two quarters of technology use.

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Figure 6. Percentage of Lessons that Used Each MSAP Resource at Enloe High School, 1993-94

Computer Hardware (N=68)	
Macintosh	84%
IBM	10%
Other	6%
Other Hardware (N=53)	
Laser disc	21%
Modem	0%
Printer	68%
Fax	0%
CD-ROM	4%
LCD Panel	0%
Multimedia Station	4%
Robotics	2%
Video Production Equipment	2%
Software (N=65)	
Word-processing	60%
Spreadsheet	2%
Educational Software	38%
E-Mail	0%

A majority of the lessons that teachers developed used Macintosh computers, with only 10% of teachers reporting using lessons in the IBM Mathematics Lab. More than two-thirds of the lessons required a printer, and about one-fourth of the lessons made use of laser-disc or CD-ROM technology. (This technology was primarily used during the fourth quarter.) An example of a laser-disc with CD-ROM lesson is "Grapes of Wrath" designed to teach an interdisciplinary history/English lesson. A majority of software use involved word-processing software, and more than one-third of the lessons used some type of educational software. Examples of educational software used include Persuasion (allowing creation of a "slide show" presentation using graphics, animation, etc.), TurboMath (designed to reinforce basic mathematics skills), and Pagemaker (designed to produce sophisticated publications using word processing and graphics).

Difficulty and Effectiveness of Lessons

Most teachers reported that the lessons they developed were easy to implement, with only 23% of teachers indicating a high level of difficulty with implementation. A majority (70%) of teachers also reported that the lessons they developed were either effective or very effective for their students.

Some insights that classroom teachers at Enloe wished to share with others regarding the difficulty and/or effectiveness of the lessons they developed were:

- Assistants are frequently necessary when using the lab with special education students.
- In an English class using PrintShop software, "This was more manageable than other projects. Most students wanted more time."

- In reference to curve fitting and using Data Analyzer software, "Good motivator! Students had opportunities to investigate other situations easily."

TEACHER TECHNOLOGY USE SURVEY

The ITRTs administered a survey which assessed teachers' attitudes towards and use of technology in the classroom to teachers in all MSAP schools in October 1993 and again in May 1994. The survey results were analyzed for the elementary schools, Ligon Middle School, and Enloe High School. Return rates in the fall were 86%, 84%, and 86% respectively, and return rates in the spring were 80%, 84%, and 86%, respectively. A copy of the survey and results for each question are available in Attachment 5. The results from the fall survey served as baseline information, and changes in teachers' perceptions and behaviors were measured across the 1993-94 school year. The survey will be given again in the spring of the 1994-95 school year to continue to track teachers' changing attitudes and behaviors related to technology use in the classroom.

TEACHERS' ATTITUDES

The survey results indicated that teachers generally believed that computers and related technology can enhance their instruction and have a positive impact on students' education (see Figure 7). Substantial increases were found at the middle school level, with teachers reporting more positive attitudes about the impact of computers on their instruction. The percentage of MSAP teachers who agreed that computers help with their instructional tasks (e.g., calculating grades) increased from fall to spring at all grade levels. This finding may be due to teachers becoming more aware of the benefits of computers through increased access to and use of tools such as word processing and spreadsheets as the school year progressed. The trend towards more negative attitudes about using technology in the classroom at the high school level may be due in part to delays in establishing the computer labs.

Figure 7. Percentage of MSAP Teachers Who Agreed or Strongly Agreed With Items Relating to Attitudes About Technology

Survey Item	Elementary (N = 224)		Middle (N = 70)		High (N = 121)	
	Pre	Post	Pre	Post	Pre	Post
Computers will change the way my subject is taught.	67%	68%	58%	76%	74%	75%
Increased use of computers in education will result in more individual attention for students.	64%	67%	60%	76%	68%	56%
Using computers provides more opportunities to develop higher order thinking skills.	69%	73%	61%	75%	69%	61%
I do not use computers because there is not enough time to cover the curriculum.	17%	13%	39%	38%	22%	27%
Computers help me do my instructional tasks more efficiently.	48%	61%	46%	54%	56%	66%

TEACHERS' EXPERIENCE

The survey results indicated that although the majority of teachers felt that technology use was important in education, many of them did not have much access to or experience with technology and did not frequently use technological tools prior to the MSAP implementation (see Figures 8 and 9). Following the first year of MSAP implementation, however, access increased, and more teachers reported that they frequently used many types of technology.

Figure 8. Percentage of MSAP Teachers Who Indicated They Had Access to Computer-Related Technology and Assistance

Survey Item	Elementary (N = 220)		Middle (N = 68)		High (N = 119)	
	Pre	Post	Pre	Post	Pre	Post
I have access to a computer for classroom instruction.	38%	61%	63%	73%	52%	51%
I have access to a computer lab.	63%	75%	50%	81%	35%	55%
I have access to a computer for teacher tasks.	68%	82%	65%	74%	68%	73%
I receive technical assistance at school when I need it.	69%	83%	53%	71%	56%	53%

Figure 9. Percentage of MSAP Teachers Who Frequently or Very Frequently Used Selected Technology

Survey Item	Elementary (N = 224)		Middle (N = 70)		High (N = 121)	
How often do you use the following for instructional preparation and/or presentation?	Pre	Post	Pre	Post	Pre	Post
Word Processing	20%	59%	36%	54%	58%	70%
Spreadsheet	4%	9%	19%	13%	22%	28%
Database	4%	9%	16%	24%	17%	24%
Telecommunications	3%	7%	11%	11%	13%	12%
Graphics Software	9%	23%	14%	18%	16%	17%
Scanners	1%	5%	11%	2%	4%	11%
Laser discs	3%	16%	7%	10%	5%	16%
CD-ROM	5%	26%	9%	11%	7%	12%
Authoring Software	4%	7%	6%	2%	5%	5%
Programming	7%	13%	9%	5%	4%	6%

Technology use increased most dramatically at the elementary level, with the most significant changes occurring for word processing, graphics software, laser discs, and CD-ROM technology. At the middle and high school levels, smaller increases were seen, with word processing and laser disc usage changing the most. These differences between grade levels may be due in part to the fact that six elementary MSAP schools were represented.

thus increasing the chances for a greater variety of technological tools to be used, while only one middle and high school were represented. Also, the Communications and Math Labs at the high school were not operational until the fourth quarter, so teachers had less opportunity to use the technology available there.

PARENT SURVEY

The Parent Survey results indicated that the vast majority of parents of students at MSAP schools and non-MSAP schools believed that using computers and related technology helps prepare their children for the future. Baseline data indicated almost no difference between MSAP and non-MSAP schools regarding parents' perceptions of their children's computer use at school. About one-third of middle school parents and one-half of high school parents do not believe that their children use a computer at school. This perception was not true for elementary schools, where a vast majority of parents reported that their children were using computers at school. Although many parents reported that their children were using computers in school, far fewer were pleased with the way their children were using computers in school. This was true for MSAP and non-MSAP schools. Figure 10 shows 1993-94 Parent survey baseline results relating to technology questions.

Figure 10. Percentage of Parents Answering Yes to Questions About Technology in Their Children's Schools.

Survey Item	MSAP Elem.	non-MSAP Elem	MSAP Middle	non-MSAP Middle	MSAP High	non-MSAP High
Does your child use a computer in school?	80%	81%	59%	51%	42%	43%
I am pleased with the way my child uses a computer in the school.	53%	54%	41%	38%	33%	35%
My child's school uses computer technology in its instructional program.	84%	83%	78%	67%	79%	66%
Using classroom instruction based on computers and related technology prepares my child for the future.	84%	87%	81%	85%	87%	80%
I would seriously consider enrolling my child in a school that offers media technology electives.	56%	46%	61%	50%	57%	45%
I would seriously consider enrolling my child in a program in which a variety of instructional technology is the critical component of the learning process.	67%	64%	70%	66%	74%	64%

Parent survey results also indicated that many parents who have not enrolled their children in one of the targeted MSAP schools might seriously consider doing so as a result of the strong technology programs in these schools. A substantial percentage of the parents of children in non-MSAP elementary, middle, and high schools indicated that they would

seriously consider enrolling their child in a school that offers media technology electives, or in a program that emphasizes technology as a critical component of the learning process.

RACIAL BALANCE

The WCPSS goal for racial balance in the magnet schools is no more than 45% minority enrollment. Schools with greater than 50% minority enrollment are considered racially isolated. Figure 11 contains the baseline data of the 1992-93 racial balances for the MSAP schools. Actual racial balance data for 1994-95 enrollment cannot be determined until fall 1994; however, preliminary data which incorporated end-of-year enrollment for 1993-94 with accepted applications for 1994-95 was collected. Six of the eight MSAP schools are projected to have a decreased percentage of minority students, suggesting that progress has been made toward the goal of eliminating or preventing minority group isolation.

Figure 11. Racial Balance Data for MSAP Schools

	Percent Minority 20-Day Enrollment in 1992-93	Percent Minority 20-Day Enrollment in 1993-94	Preliminary Minority Enrollment for 1994-95
Bugg	49%	47%	45%
Conn	49%	44%	42%
Fuller	49%	49%	49%
Hunter	46%	43%	38%
Powell	49%	49%	47%
Poe	51%	54%	58%
Ligon Middle	47%	46%	44%
Enloe High	50%	46%	45%

STUDENT ACHIEVEMENT

LONGITUDINAL COHORT BASELINE DATA

End-of-Grade (EOG) mathematics and reading achievement data was collected for 4th grade students at MSAP elementary schools, and a team of 6th grade students who received additional services at Ligon Middle School, in order to provide an assessment of the impact of the MSAP program on individual achievement. The evaluation intended to compare the progress of these 1993-94 4th and 6th graders by examining the percents of the majority and minority students considered proficient (scoring at levels III or IV) on EOG tests in mathematics and reading for 1992-93 (baseline) and 1993-94. However, since this data was not available for the 1993-94 school year when this report was completed, baseline data (1992-93) for both the 4th and 6th grade cohorts are provided below, and 1993-94 follow-up data will be included in the final report.

Staff at Enloe High School identified a group of highly-able 10th and 11th grade students (who scored above the 80th percentile on 1992-93 End-of-Course tests) who were enrolled in average classes in 1993-94. These students were counseled to enroll in advanced courses, and teachers of average classes in which these students were enrolled were encouraged to frequently use the Communications and Math technology labs so that these

students would have access to technology to help them prepare for advanced courses. Program evaluators also identified a comparison group of 1991-92 10th and 11th grade minority students at Enloe who scored above the 80th percentile on any of the 1990-91 End-of-Course tests. The evaluation will monitor progress toward the objective of an 8% increase in the average number of advanced courses completed with a C or better as compared with the control group's 11th and 12th grade average number of advanced courses completed with a C or better. For the purposes of this report, comparison group data only will be described, because data on advanced course success was not yet available for the targeted MSAP group of students.

Elementary School Cohort Baseline Data

Figure 12 provides baseline data on the percentages of 4th grade white and minority students scoring at Levels III or IV (as 3rd graders) on the 1992-93 EOG reading and mathematics tests at each MSAP school. These data reflect the discrepancy in performance between white and minority students at MSAP schools in both reading and mathematics; data will be reported in the final report to determine whether the gap between white and minority students decreased in 1993-94.

Figure 12. Fourth Grade Cohort Baseline Data: Percentage of Students Scoring at Levels III or IV on 1992-93 End-of-Grade Tests

	Reading		Mathematics	
School	White	Minority	White	Minority
Bugg	68%	56%	70%	53%
Conn	84%	61%	86%	42%
Fuller	92%	54%	84%	46%
Hunter	89%	49%	92%	49%
Poe	89%	38%	85%	38%
Powell	86%	54%	83%	60%

Middle School Cohort Baseline Data

Figure 13 provides baseline data on the percentages of 6th grade white and minority students on the targeted team at Ligon Middle School scoring at Levels III or IV (as 5th graders) on the 1992-93 EOG reading and mathematics tests. These data reflect the substantial gap between minority and white students, similar to the elementary grades.

Figure 13. Sixth Grade Cohort Baseline Data: Percentage of Students Scoring at Levels III or IV on 1992-93 End-of-Grade Tests

Ligon Middle School	Reading	Mathematics
White	87%	83%
Minority	44%	45%

High School Cohort Comparison Group

Figure 14 provides data on the average number of advanced courses taken and successfully completed for the comparison group of students (1991-92 10th and 11th grade minority students who scored above the 80th percentile on any of the 1990-91 End-of-Course tests). These data reflect the advanced course completion rate for these students as 10th and 11th graders in 1991-92, and then as 11th and 12th graders in 1992-93. (See the Attachments for a list of advanced courses at Enloe.)

Figure 14. Advanced Courses Taken and Successfully Completed for Comparison Group of High Achieving Minority Students in 1991-92 and 1992-93

School Year	Average No. of Advanced Courses Completed	Average No. of Advanced Courses Completed with "C" or Better	Average No. of Advanced English Courses Completed with "C" or Better	Average No. of Advanced Math Courses Completed with "C" or Better	Average No. of Advanced Science Courses Completed with "C" or Better	Average No. of Advanced Social Studies Courses Completed with "C" or Better
1991-92	1.25	0.92	0.26	0.15	0.30	0.21
1992-93	0.72	0.56	0.19	0.08	0.18	0.11

These data demonstrate that academically-advanced (as defined by End-of-Course tests) minority students at Enloe were only enrolling in and successfully completing a very small number of advanced level courses as recently as 1992-93. It is apparent that the interventions which took place in 1993-94 and which are planned for 1994-95 are necessary steps to increase the likelihood that academically-advanced minority students are challenged to fulfill their academic potential.

OVERALL SCHOOL ACHIEVEMENT

To determine whether MSAP resources impacted academic climates at participating schools, overall school EOG achievement data were examined. These data are reported in terms of percentages of students at proficiency levels of III or IV (students considered to be proficient) on EOG reading and mathematics subtests. All MSAP schools are attempting to reduce the existing performance gap between majority and minority students by at least 8%.

For the final report, 1993-94 results will be compared to 1992-93 results to determine whether this objective was achieved. Also, any schools that are below WCPSS percents for the number of students at or above proficiency levels III and IV are attempting to reduce the difference by 8%. The data were only available for 1992-93 (baseline) when this report was completed, and these results are presented below.

Elementary Schools

Figure 15 provides EOG baseline data for MSAP elementary schools compared with WCPSS. All schools had some percentages that were below WCPSS percentages; however, in many cases the differences were very small.

Figure 15. Overall Elementary School Baseline Data: Percentage of Students Scoring at Levels III or IV on 1992-93 End-of-Grade Tests

		3rd Grade		4th Grade		5th Grade	
School	**Race**	**Reading**	**Math**	**Reading**	**Math**	**Reading**	**Math**
Bugg	White	72%	72%	66%	81%	74%	66%
	Minority	62%	49%	55%	63%	58%	50%
	Total	67%	61%	62%	73%	67%	58%
Conn	White	84%	86%	76%	84%	91%	93%
	Minority	52%	41%	42%	42%	52%	50%
	Total	69%	65%	63%	67%	72%	72%
Fuller	White	87%	76%	85%	89%	92%	92%
	Minority	48%	33%	60%	58%	54%	39%
	Total	70%	58%	74%	74%	74%	67%
Hunter	White	90%	91%	96%	94%	92%	94%
	Minority	44%	44%	47%	50%	41%	48%
	Total	69%	70%	69%	69%	73%	77%
Poe	White	75%	70%	80%	84%	86%	79%
	Minority	40%	33%	45%	48%	55%	52%
	Total	60%	55%	65%	70%	70%	65%
Powell	White	93%	95%	91%	91%	91%	82%
	Minority	60%	60%	57%	57%	59%	54%
	Total	76%	77%	77%	77%	73%	66%
WCPSS	White	84%	84%	84%	87%	85%	85%
	Minority	51%	47%	52%	54%	52%	49%
	Total	74%	72%	74%	76%	75%	74%

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At all schools at all grade levels, a large discrepancy exists between white and minority student performance in both reading and math. These data demonstrate the need to improve instruction for diverse populations, and increased technology use by teachers may be one way to achieve this outcome.

Middle School

Figure 16 shows baseline EOG results for Ligon Middle compared with WCPSS results for 1992-93.

Figure 16. Overall Middle School Baseline Data: Percentage of Students Scoring at Levels III or IV on 1992-93 End-of-Grade Tests

		6th Grade		7th Grade		8th Grade	
School	**Race**	**Reading**	**Math**	**Reading**	**Math**	**Reading**	**Math**
Ligon	**White**	90%	90%	90%	92%	93%	91%
	Minority	61%	54%	56%	56%	60%	52%
	Total	78%	74%	74%	75%	77%	73%
WCPSS	**White**	80%	84%	80%	84%	84%	84%
	Minority	49%	49%	51%	50%	55%	53%
	Total	70%	73%	72%	74%	76%	75%

Again, the gap between white and minority students is large at all grades in both subject areas, and increased use of technology may be one catalyst to improve instruction for diverse populations of students.

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SUMMARY AND CONCLUSIONS

To what extent was MSAP implemented, and how did teachers' attitudes towards and use of technology change across the school year?

By the end of 1993-94, most of the program components at the elementary and middle school level had been successfully implemented; there was some delay, however, in program implementation at the high school level. Most of the initial implementation problems (e.g., adequate space, wiring and security issues) were overcome by the end of 1993-94.

Teacher attitudes about using technology improved from fall to spring, as they gained training and experience. The substantial increase in the number of teachers using MSAP resources from fall to spring suggests that the training was effective. Classroom teachers reported that the ITRTs were critical to successful use of technology in classrooms. The most frequently used technological tools were word processing, printers, and educational software, although towards the end of the year teachers increasingly used tools such as laser disc and CD-ROM technologies. The only resource that was not adequately implemented at most schools by the end of 1993-94 was telecommunications. Teachers generally received Internet training at the end of the year, and most schools indicated that this technology would be used more frequently with students next year.

What were parents' attitudes about technology use in schools?

Parent Survey data indicated that parents believed technology is important, and many parents who do not currently have children enrolled in MSAP schools would consider enrolling their child in a school that offers a variety of instructional technology in classrooms. Program staff should use these findings in recruiting efforts to increase applications to MSAP schools.

Did MSAP affect the racial balance within schools?

The first year of MSAP, although successfully implemented to a large degree, was not very effective in recruiting new applicants, probably because of insufficient recruiting efforts. The racial balances in the MSAP schools cannot be completely determined until fall 1994, but preliminary data suggests that progress has been made towards attracting more majority students to these schools.

What impact did MSAP have on academic achievement for the grant schools and for cohorts of students followed over time?

Achievement data following the first year of program implementation were not available when this report was written, but baseline data show large differences between majority and minority achievement in these schools. All schools had some percentages of students that were below WCPSS proficiency-level percentages, however, in many cases the differences were very small. High school comparison-group data show that academically-advanced minority students successfully completed very few advanced courses in past years. These data indicate that programs to address these achievement discrepancies are important.

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ATTACHMENT 1
GLOSSARY OF TECHNOLOGY TERMS

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GLOSSARY OF TECHNOLOGY TERMS

Adobe Photoshop:	A sophisticated program that allows the user to edit scanned images, photographs, etc.
Children's Writing and Publishing Center:	A popular creative writing program for elementary grades; allows students to add illustrations to their stories, articles, poems, etc.
ClarisWorks:	A software package which includes word processing, spreadsheet, and graphics capabilities.
HyperStudio:	An authoring tool (software) that allows the user to produce interactive multimedia presentations; similar to Hyper Card; popular with students because of its user-friendly appeal.
KidsNet:	A telecommunications network service for children.
KidWorks:	A word processing program for children.
Lego/Logo Robotics:	A concept for learning that combines the Logo programming language with Lego constructions. Children follow diagrams to build constructions and physically connect them by way of an interface box to the computer. They then write programs which enable to models to carry out commands. The program teaches the foundations of physics to elementary and middle school students.
MacGlobe:	Geography software designed to teach and reinforce middle and high school students' geography skills.
MECC software:	Software produced and distributed by Minnesota Educational Computer Corporation; addresses primarily the four core subject areas, grades K-12.
PageMaker:	A graphics, word processing software package which facilitates formatting text and graphics.
PAWS Keyboarding:	An interactive software package designed for individual keyboarding instruction.
Persuasion:	A computer program that allows the user to create a "slide show" presentation; presentations may include graphics, quicktime movies, animation, interesting transitions, and more; useful as a teaching tool and also as a student productivity tool.
PrintShop:	A graphics software package designed for making banners, greeting cards, and signs.

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TurboMath:	An educational software package for reinforcing basic mathematics skills.
SimCity:	A software package that simulates running a city, including the effects of economical, educational, social, and political decision making.
Vernier Probes:	An apparatus that allows a student to conduct science experiments; plugs into the Macintosh computer and measures temperature, for example, and subsequently stores the temperature data in a file on the computer.
Weather Station:	Proposed by Bugg Elementary as a station equipped with scientific equipment where students might have first-hand experience studying the weather.
Windows on Science:	A series of laser discs that teach various units in science accompanied by teacher guides; producers claim that this set is a complete science curriculum for grades K-8.

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ATTACHMENT 2

ENLOE ADVANCED COURSES LIST

List of Advanced courses for Enloe:

Course Name	Course Number
English	
AG English 9	0915
C&C 9 GTC	1000
AG English 10	1026
AG English 11	1036
Paideia 10	1932
Paideia 11	1934
College Wrt. GT	1095
College Wrt. II	1096
Social Studies	
World Civ. GT	4071
Adv. U.S. Hist.	4070
AP U.S. Hist.	4086
Math	
Geometry GT	2204
Algebra II GT	2304
Adv. Math GT	2402
Pre-Cal. GTC	2105
Science	
Adv. Biology	3112
Adv. Biology GTC	3114
An. Phys. GT	3992
Adv. Chem	3209
Adv. Chem GTC	3212
AP Chem GTC	3150
Adv. Physics	3310
AP Physics B GTC	3312
AP Physics C GTC	3326

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ATTACHMENT 3

TRAINING FOR INSTRUCTIONAL TECHNOLOGY RESOURCE TEACHERS, 1993-94

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Workshop/Seminar*	Date
Apple/IBM Hardware Demonstrations	8/31/93
P.E.T.A.L.S. (Parent Exploring Teaching and Learning Styles)	9/15 - 9/17/93
Explorations in Instructional Software	10/1/93
Evaluating Instructional Software	10/13/93
Macintosh Basics: From Setup to System 7	10/28 10/29/93 and 11/12/93
The Art of Persuasion: A Tool for Teaching	11/18 - 11/19/93
NCetc, Technology Conference	11/29 - 12/1/94
Advanced ClarisWorks	2/3 - 2/4/94 and 2/25/94
Making the Most of the Quadra 660AV	2/18/94
NandoLand: Gateway to the Internet	3/18/94 and 3/24/94
Network Administrator Training	4/29/94 and 5/6/94
Tapping the Power of Today's Technology	5/13 - 5/14/94, 5/27/95, and 6/3/94
Video Production and Authoring Interactive Multimedia	6/13 - 6/17/94

*All ITRTs participated in each of these workshops.

ATTACHMENT 4
TECHNOLOGY USE DATA SHEETS

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TECHNOLOGY USE DATA SHEET

Please complete this data sheet after you have implemented your lesson using technology. Your cooperation is critical to ensure that we obtain information that will help us in planning for future resources and training. If the appropriate choice is not provided on a question, please write in your response. Thank you!

GENERAL INFORMATION

1. Name_____Date of lesson:_____
2. Subject Area of Lesson _____
3. Grade Level _____
4. Class Size: (circle one)

   1-5 6-10 11-15 16-20 21-25 26-30 30+
5. Ability Level of Class: (circle one)

   remedial regular gifted heterogeneous (not tracked)

TYPE OF TECHNOLOGY USED

1. Hardware: Circle all that were used in the lesson:
   a. Computer: Macintosh IBM Other
   b. Modem c. Printer d. Fax Machine
   e. CD-ROM f. LCD Panels g. Multimedia Stations
   h. Robotics i. Laser discs
2. Software Circle all that were used in the lesson:
   a. word processor b. spreadsheet c. E-Mail
   d. Educational software (please specify) _____
3. Video Production Equipment
4. Other (please specify)_____

SETTING OF THIS LESSON & INSTRUCTIONAL STYLE

1. Time of lesson: (circle one)
   a. during school b. before school c. after school
2. Student grouping: (circle one)
   a. Individual (one on one) b. small group c. whole class
   d. With how many classes did you use this lesson?_____

3. Type of instruction: (circle one)

   a. lecture b. cooperative learning c. projects

   d. lab e. other or combination, please

DESCRIPTION OF LESSON

1. How long did it take you to design the lesson? (in minutes)

   _____

2. Did you adapt an existing lesson, or create a new one? Explain.

3. Was the lesson: (circle one)

   a. interdisciplinary b. single subject

4. Was the lesson designed to: (circle one)

   a. cover the regular curriculum b. supplement/enrich curriculum

   c. teach students to use the technology

5. Describe the goal of the lesson.

LESSON OUTCOMES

1. How difficult was it to implement the lesson? Rate on a scale of 1 to 5, with 1=easy, 5=difficult.

   1 2 3 4 5

2. How effective was the lesson? Rate on a scale of 1 to 5, with 1=not at all, 5=very effective.

   1 2 3 4 5

3. Please share any insights about this lesson that might benefit others.

4. Describe any problems you encountered implementing this lesson.

ATTACHMENT 5
MSAP TEACHER SURVEY AND RESULTS

TEACHER SURVEY

The Wake County Public School System is conducting a survey to find out how teachers feel about technology, to what extent they use technology in their classes, and how they feel it impacts instruction.

DIRECTIONS: Use a number 2 pencil to answer the questions on the answer sheet provided. Fill in the name of your school in the space marked LAST NAME and fill in your school code in the space marked IDENTIFICATION NUMBER on side 1 of your answer sheet. Please read each question carefully and follow all directions. Where a selection asks you to specify, write your response on this survey in the blank provided.

1. Total years of teaching experience:
   a. 0-3
   b. 4-6
   c. 7-9
   d. 8-10
   e. 11+
2. Your age:
   a. 21-30
   b. 31-39
   c. 40-49
   d. 50+

3. What grade do you teach?
   a. K-1
   b. 2-3
   c. 4-5
   d. 6-8
   e. 9-12
   f. specialist, Please specify here:_____

4. Major subject areas you are now teaching:
   a. elementary, all core subjects
   b. elementary, specialist
   Middle or High school:
   c. math
   d. language arts
   e. science
   f. social studies
   g. health and PE
   h. vocational education
   i. computer studies
   j. other, Please specify here:_____

5. Highest degree you presently hold:
   a. High School Diploma
   b. Associate Degree
   c. Bachelors Degree
   d. Masters Degree
   e. Sixth Year (Advanced Certificate)
   f. Doctorate Degree

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For questions 6-15 use the following scale:

a. Strongly Agree
b. Agree
c. Undecided
d. Disagree
e. Strongly Disagree

6. Computers will change the way my subject is taught.
7. I feel personal satisfaction when I learn something new on the computer.
8. Increased use of computers in education will result in more individual attention for students.
9. Use of computers and related technology in the classroom increases student motivation.
10. Using computers provides more opportunity to develop higher order thinking skills.
11. Computers and related technology can efficiently reinforce what is taught.
12. I believe all teachers should become competent in using computers.
13. I do not use computers because there is not enough time to cover the curriculum.
14. Computers help me do my instructional tasks more efficiently.
15. I think money spent on instructional technology could be better spent on other materials.

For questions 16-27 use the following scale to indicate how often you each technology for instructional preparation and/or presentation.

a. Never
b. Seldom
c. Occasionally
d. Frequently
e. Very Frequently

16. Word processing
17. Spreadsheet
18. Database
19. Telecommunications
20. Graphics software (e.g., MacDraw)
21. Scanners
22. Laser discs
23. CD-ROM
24. Authoring software (e.g., Hypercard or Linkway)
25. Video camera and/or editing equipment
26. Programming
27. VCR

For questions 28-32 use the following scale to indicate whether you feel you can access and use technology:

a. Yes
b. Sometimes
c. No

28. I have access to a computer for classroom instruction.

29. I have access to a computer lab.

30. I have access to a computer for teacher tasks.

31. Every teacher should be provided with a personal computer.

32. I receive technical assistance at school when I need it.

For questions 33-38 use the following scale to estimate the percent of instructional time you use for each teaching activity:

a. 0%
b. 1-25%
c. 26-50%
d. 51-75%
e. 76-100%

33. Lecture

34. Class discussion

35. Student questions/answers

36. Inquiry or guided discovery

37. Cooperative learning groups

38. Other, Please specify here:_____

Note: Some of the items on this survey were adapted from a survey for the National Science Foundation - 21st Century. Copyright (c) 1990 by the Center for Research in Mathematics and Science Education, NCSU.

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TEACHER TECHNOLOGY-USE SURVEY
(MSAP Elementary Schools)

Strongly Agree to Strongly Disagree Items

Survey Item	Number of Respondents		Strongly Agree + Agree		Strongly Agree		Agree		Undecided		Strongly Disagree + Disagree		Disagree		Strongly Disagree	
	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post
6. Computers will change the way my subject is taught.	224	206	67%	68.4%	21.9%	25.2%	45.1%	43.2%	16.1%	16%	17%	15.5%	11.6%	9.7%	5.4%	5.8%
7. I feel personal satisfaction when I learn something new on the computer.	224	208	89.7%	94%	50.9%	61.5%	38.8%	32.2%	8.0%	3.4%	2.2%	2.9%	0.9%	1.4%	1.3%	1.4%
8. Increased use of computers in education will result in more individual attention for students.	224	208	64.3%	67.3%	22.3%	28.4%	42.0%	38.9%	27.7%	23%	8.1%	9.6%	6.3%	7.2%	1.8%	2.4%
9. Use of computers and related technology in the classroom increases student motivation.	223	208	86.1%	88.9%	36.3%	47.1%	49.8%	41.8%	12.6%	8.7%	1.3%	2.4%	0.9%	1.4%	0.4%	0.9%
10. Using computers provides more opportunities to develop higher order thinking skills.	223	208	69.1%	72.6%	25.6%	28.4%	43.5%	44.2%	24.7%	20.7%	6.2%	6.7%	4.9%	5.3%	1.3%	1.4%
11. Computers and related technology can efficiently reinforce what is taught.	223	208	91.9%	94%	43.0%	42.3%	48.9%	51.4%	6.7%	4.3%	1.3%	1.9%	0.4%	0.9%	0.9%	0.9%
12. I believe all teachers should become competent in using computers.	223	208	87.9%	91.3%	47.5%	52.9%	40.4%	38.5%	8.1%	5.8%	4%	2.9%	2.2%	0.9%	1.8%	1.9%
13. I do not use computers because there is not enough time to cover the curriculum.	221	203	17.2%	12.8%	7.2%	3.9%	10.0%	8.9%	19.5%	11.8%	63.3%	75.4%	39.8%	47.3%	23.5%	28.1%
14. Computers help me do my instructional tasks more efficiently.	224	207	48.2%	61.3%	15.6%	20.3%	32.6%	41.1%	31.3%	24.2%	20.6%	14.5%	14.3%	11.1%	6.3%	3.4%
15. I think money spent on instructional technology could be better spent on other materials.	223	208	8.5%	9.1%	4.0%	4.3%	4.5%	4.8%	27.4%	21.6%	64.1%	69.2%	41.7%	41.3%	22.4%	27.9%

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Never to Very Frequently Items

Survey Item	Number of Respondents		Never + Seldom		Never		Seldom		Occasionally		Frequently + Very Frequently		Frequently		Very Frequently	
Indicate how often you use each technology for instructional preparation and/or presentation:	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post
16. Word Processing	221	208	46.6%	23%	32.6%	14.4%	14.0%	8.7%	16.7%	17.8%	19.9%	59.1%	19.0%	28.8%	0.9%	30.3%
17. Spreadsheet	222	207	90.1%	72%	74.8%	54.6%	15.3%	17.4%	6.3%	18.8%	3.6%	9.2%	2.7%	6.3%	0.95	2.9%
18. Database	222	207	84.7%	71.5%	69.8%	55.6%	14.9%	15.9%	11.2%	19.8%	4.1%	8.7%	3.2%	5.8%	0.9%	2.9%
19. Telecommunications	221	205	90.5%	82.9%	78.3%	64.9%	12.2%	18%	6.8%	9.8%	2.7%	7.3%	1.8%	3.9%	0.9%	3.4%
20. Graphics software (e.g., MacDraw)	222	208	73%	50.5%	54.1%	34.6%	18.9%	15.9%	18.0%	26.4%	9.1%	23.1%	5.0%	13.5%	4.1%	9.6%
21. Scanners	221	207	96.3%	84.1%	88.2%	72.5%	8.1%	11.6%	2.3%	11.1%	1.4%	4.8%	0.9%	2.4%	0.5%	2.4%
22. Laser discs	221	207	88.3%	58.9%	78.3%	37.7%	10.0%	21.3%	8.6%	25.6%	3.2%	15.5%	0.9%	12.6%	2.3%	2.9%
23. CD-ROM	222	207	83.4%	54.1%	74.8%	39.6%	8.6%	14.5%	12.2%	19.8%	4.6%	26.1%	2.3%	18.8%	2.3%	7.2%
24. Authoring software (e.g., Hypercard or Linkway)	222	206	88.7%	80.6%	80.6%	69.9%	8.1%	10.7%	7.2%	12.6%	4.1%	6.8%	2.3%	3.9%	1.8%	2.9%
25. Vidoe Camera and/or editing equipment.	222	206	68.0%	57.8%	47.3%	38.4%	20.7%	19.4%	22.1%	24.3%	9.9%	18%	5.4%	11.7%	4.5%	6.3%
26. Programming	221	204	84.6%	70.1%	69.7%	52.5%	14.9%	17.7%	8.2%	17.2%	7.2%	12.8%	3.6%	8.3%	3.6%	4.4%
27. VCR	222	206	31.8%	23.8%	17.1%	10.7%	14.7%	13.1%	36.0%	29.1%	32.0%	47.1%	20.7%	33%	11.3%	14.1%

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Yes, Sometimes, No Items

Survey Item	Number of Respondents		Yes		Sometimes		No	
	Pre	Post	Pre	Post	Pre	Post	Pre	Post
28. I have access to a computer for classroom instruction.	220	205	37.7%	60.5%	22.3%	21%	40.0%	18.5%
29. I have access to a computer lab.	220	206	63.3%	75.2%	29.5%	20.9%	6.8%	3.9%
30. I have access to a computer for teacher tasks.	220	205	67.7%	82%	22.7%	15.6%	9.5%	2.4%
31. Every teacher should be provided with a personal computer.	220	204	78.2%	83.8%	9.5%	7.8%	12.3%	8.3%
32. I receive technical assistance at school when I need it.	219	203	68.5%	83.3%	26.5%	14.8%	4.1%	2%

Items on which teachers estimated the percentage of time used for each teaching activity.

Survey Item	Number of Respondents		Less than 50%		0%		1-25%		26-50%		More than 50%		51-75%		76-100%	
Estimate the percent of instructional time you use for each teaching activity.	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post
33. Lecture	217	201	95.4%	93.5%	17.1%	14.9%	63.1%	61.2%	15.2%	17.4%	4.6%	6.5%	4.1%	4.5%	0.5%	2.0%
34. Class discussion	217	201	87.6%	83.1%	6.0%	3.5%	53.0%	54.2%	28.6%	25.4%	12.5%	16.9%	9.7%	11.9%	2.8%	5.0%
35. Student questions/answers	215	201	85.1%	81.1%	3.7%	4.5%	58.1%	53.2%	23.3%	23.4%	14.9%	18.9%	11.6%	14.9%	3.3%	4.0%
36. Inquiry or guided discovery	211	200	77.3%	69.5%	7.1%	5.5%	38.9%	35.0%	31.3%	29.0%	22.7%	31.5%	18.0%	22.0%	4.7%	9.5%
37. Cooperative learning groups	198	192	80.4%	74.5%	8.6%	6.3%	45.5%	42.2%	26.3%	26.0%	19.7%	25.5%	14.1%	18.2%	5.6%	7.3%
38. Other	45	35	64.5%	80.0%	28.9%	40.0%	28.9%	28.6%	6.7%	11.4%	28.5%	20.0%	24.4%	14.3%	4.1%	5.7%

TEACHER TECHNOLOGY-USE SURVEY
(MSAP Middle School)

Strongly Agree to Strongly Disagree Items

Survey Item	Number of Respondents		Strongly Agree + Agree		Strongly Agree		Agree		Undecided		Strongly Disagree + Disagree		Disagree		Strongly Disagree	
	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post
6. Computers will change the way my subject is taught.	69	63	57.9%	76.2%	18.8%	38.1%	39.1%	38.1%	20.2%	12.7%	21.7%	11.1%	15.9%	4.8%	5.8%	6.3%
7. I feel personal satisfaction when I learn something new on the computer.	70	63	87.2%	90.5%	44.3%	52.4%	42.9%	38.1%	10%	4.8%	2.8%	4.8%	1.4%	1.6%	1.4%	3.2%
8. Increased use of computers in education will result in more individual attention for students.	70	63	60.0%	76.2%	17.1%	28.6%	42.9%	47.6%	30.0%	22.2%	10.0%	1.6%	4.3%	0%	5.7%	1.6%
9. Use of computers and related technology in the classroom increases student motivation.	70	62	84.3%	90.3%	34.3%	51.6%	50.0%	38.7%	8.6%	8.1%	7.1%	1.6%	5.7%	0%	1.4%	1.6%
10. Using computers provides more opportunities to develop higher order thinking skills.	69	63	60.8%	74.6%	21.7%	36.5%	39.1%	38.1%	30.4%	20.6%	8.7%	4.8%	5.8%	3.2%	2.9%	1.6%
11. Computers and related technology can efficiently reinforce what is taught.	70	63	84.3%	88.9%	38.6%	46%	45.7%	42.9%	10.0%	9.5%	5.7%	1.6%	5.7%	0%	0.0%	1.6%
12. I believe all teachers should become competent in using computers.	70	63	91.4%	93.7%	45.7%	52.4%	45.7%	41.3%	8.6%	1.6%	0.0%	4.8%	0.0%	1.6%	0.0%	3.2%
13. I do not use computers because there is not enough time to cover the curriculum.	70	63	38.6%	38.1%	15.7%	11.1%	22.9%	27%	14.3%	14.3%	47.1%	47.6%	30.0%	23.8%	17.1%	23.8%
14. Computers help me do my instructional tasks more efficiently.	69	63	46.3%	54.0%	15.9%	17.5%	30.4%	36.5%	29.0%	31.7%	24.6%	14.3%	13.0%	7.9%	11.6%	6.3%
15. I think money spent on instructional technology could be better spent on other materials.	70	63	27.2%	19.0%	8.6%	6.3%	18.6%	12.7%	20.0%	15.9%	52.8%	65.1%	35.7%	44.4%	17.1%	20.6%

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Never to Very Frequently Items

Survey Item	Number of Respondents		Never + Seldom		Never		Seldom		Occasionally		Frequently + Very Frequently		Frequently		Very Frequently	
Indicate how often you use each technology for instructional preparation and/or presentation:	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post
16. Word Processing	69	63	34.7%	27.0%	21.7%	15.9%	13.0%	11.1%	29.0%	19%	36.2%	54.0%	17.4%	30.2%	18.8%	23.8%
17. Spreadsheet	70	62	72.9%	72.9%	58.6%	58.1%	14.3%	16.1%	8.6%	12.9%	31.5%	12.9%	12.9%	8.1%	5.7%	4.8%
18. Database	70	63	70.0%	65.1%	44.3%	41.3%	25.7%	23.8%	14.3%	11.1%	15.7%	23.8%	10.0%	19.0%	5.7%	4.8%
19. Telecommunications	70	63	77.1%	82.5%	67.1%	65.1%	10.0%	17.5%	11.4%	6.3%	11.4%	11.1%	4.3%	4.8%	7.1%	6.3%
20. Graphics software (e.g., MacDraw)	70	62	67.1%	58.1%	45.7%	40.3%	21.4%	17.7%	18.6%	24.2%	14.2%	17.7%	7.1%	12.9%	7.1%	4.8%
21. Scanners	70	63	87.1%	93.7%	77.1%	84.1%	10.0%	9.5%	1.4%	4.8%	11.4%	1.6%	4.3%	0%	7.1%	1.6%
22. Laser discs	70	63	90.0%	68.3%	78.6%	58.7%	11.4%	9.5%	2.9%	22.2%	7.2%	9.5%	2.9%	9.5%	4.3%	0%
23. CD-ROM	70	62	82.9%	79.0%	72.9%	61.3%	10.0%	17.7%	8.6%	9.7%	8.6%	11.3%	4.3%	11.3%	4.3%	0%
24. Authoring software (e.g., Hypercard or Linkway)	68	63	89.7%	85.7%	79.4%	71.4%	10.3%	14.3%	4.4%	12.7%	5.9%	1.6%	1.5%	1.6%	4.4%	0%
25. Vidoe Camera and/or editing equipment.	69	63	73.9%	71.4%	53.6%	44.4%	20.3%	27.0%	14.5%	17.5%	11.5%	11.1%	7.2%	9.5%	4.3%	1.6%
26. Programming	68	62	82.3%	80.6%	67.6%	64.5%	14.7%	16.1%	8.8%	14.5%	8.8%	4.8%	5.9%	3.2%	2.9%	1.6%
27. VCR	68	63	42.6%	30.2%	25.0%	12.7%	17.6%	17.5%	35.3%	31.7%	22.1%	38.1%	14.7%	25.4%	7.4%	12.7%

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Yes, Sometimes, No Items

Survey Item	Number of Respondents		Yes		Sometimes		No	
	Pre	Post	Pre	Post	Pre	Post	Pre	Post
28. I have access to a computer for classroom instruction.	68	63	63.2%	73.0%	17.6%	12.7%	18.8%	14.3%
29. I have access to a computer lab.	68	62	50.0%	80.6%	32..4%	17.7%	17.6%	1.6%
30. I have access to a computer for teacher tasks.	68	62	64.7%	74.2%	23.5%	21.0%	11.8%	4.8%
31. Every teacher should be provided with a personal computer.	67	61	83.6%	90.2%	9.0%	4.9%	7.5%	4.9%
32. I receive technical assistance at school when I need it.	68	61	52.9%	70.5%	35.3%	27.9%	11.8%	1.6%

Items on which teachers estimated the percentage of time used for each teaching activity.

Survey Item	Number of Respondents		Less than 50%		0%		1-25%		26-50%		More than 50%		51-75%		76-100%	
Estimate the percent of instructional time you use for each teaching activity.	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post
33. Lecture	68	62	98.5%	98.4%	13.2%	8.1%	66.2%	62.9%	19.1%	27.4%	20.6%	1.6%	19.1%	1.6%	1.5%	0%
34. Class discussion	67	62	95.5%	87.1%	1.5%	6.5%	68.6%	54.8%	25.4%	25.8%	4.5%	12.9%	3.0%	11.3%	1.5%	1.6%
35. Student questions/answers	67	62	92.6%	88.7%	1.5%	8.1%	61.2%	62.9%	29.9%	17.7%	7.5%	11.3%	6.0%	9.7%	1.5%	1.6%
36. Inquiry or guided discovery	67	61	82.1%	82.0%	1.5%	4.9%	59.7%	57.4%	20.9%	19.7%	17.9%	18.1%	11.9%	14.8%	6.0%	3.3%
37. Cooperative learning groups	60	60	80%	76.7%	3.3%	6.7%	60.0%	51.7%	16.7%	18.3%	20.0%	23.4%	15.0%	16.7%	5.0%	6.7%
38. Other	26	12	76.9%	91.7%	26.9%	25.0%	34.6%	50.0%	15.4%	16.7%	23.0%	8.3%	19.2%	0.0%	3.8%	8.3%

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TEACHER TECHNOLOGY-USE SURVEY
(MSAP High School)

Strongly Agree to Strongly Disagree Items

Survey Item	Number of Respondents		Strongly Agree + Agree		Strongly Agree		Agree		Undecided		Strongly Disagree + Disagree		Disagree		Strongly Disagree	
	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post
6. Computers will change the way my subject is taught.	121	110	73.5%	74.5%	35.5%	35.5%	38.0%	39.1%	12.4%	15.5%	14.0%	10.0%	13.2%	6.4%	0.8%	3.6%
7. I feel personal satisfaction when I learn something new on the computer.	121	110	90.9%	92.7%	52.9%	59.1%	38.0%	33.6%	5.0%	5.5%	4.1%	1.8%	3.3%	1.8%	0.8%	0%
8. Increased use of computers in education will result in more individual attention for students.	121	110	67.8%	55.5%	29.8%	21.8%	38.0%	33.6%	19.8%	33.6%	12.4%	10.9%	11.6%	7.3%	0.8%	3.6%
9. Use of computers and related technology in the classroom increases student motivation.	121	110	73.5%	72.7%	34.7%	26.4%	38.8%	46.4%	24.8%	22.7%	1.7%	4.5%	1.7%	3.6%	0.0%	0.9%
10. Using computers provides more opportunities to develop higher order thinking skills.	121	110	69.4%	60.9%	25.6%	20.0%	43.8%	40.9%	26.4%	30.0%	4.1%	9.1%	3.3%	7.3%	0.8%	1.8%
11. Computers and related technology can efficiently reinforce what is taught.	121	110	89.3%	87.3%	46.3%	36.4%	43.0%	50.9%	9.1%	10.9%	1.6%	1.8%	0.8%	1.8%	0.8%	0.0%
12. I believe all teachers should become competent in using computers.	121	110	89.3%	90.0%	48.8%	48.2%	40.5%	41.8%	8.3%	7.3%	2.5%	2.7%	2.5%	1.8%	0.0%	0.9%
13. I do not use computers because there is not enough time to cover the curriculum.	121	109	22.3%	26.6%	5.8%	11.0%	16.5%	15.6%	23.1%	15.6%	54.5%	57.8%	28.1%	30.3%	26.4%	27.5%
14. Computers help me do my instructional tasks more efficiently.	121	110	56.2%	65.5%	27.3%	34.5%	28.9%	30.9%	28.1%	25.5%	15.7%	9.1%	9.9%	5.5%	5.8%	3.6%
15. I think money spent on instructional technology could be better spent on other materials.	121	110	17.3%	14.5%	7.4%	1.8%	9.9%	12.7%	23.1%	26.4%	59.5%	59.1%	34.7%	37.3%	24.8%	21.8%

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Never to Very Frequently Items

Survey Item	Number of Respondents		Never + Seldom		Never		Seldom		Occasionally		Frequently + Very Frequently		Frequently		Very Frequently	
Indicate how often you use each technology for instructional preparation and/or presentation:	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post
16. Word Processing	120	110	28.4%	19.1%	16.7%	10.0%	11.7%	9.1%	13.3%	10.9%	58.3%	70.0%	17.5%	21.8%	40.8%	48.2%
17. Spreadsheet	121	109	60.3%	56.0%	46.3%	43.1%	14.0%	12.8%	18.2%	5.6%	21.5%	28.4%	11.6%	13.8%	9.9%	14.7%
18. Database	112	110	67.3%	62.7%	55.5%	44.5%	11.8%	18.2%	16.0%	13.6%	16.8%	23.6%	9.2%	18.2%	7.6%	5.5%
19. Telecommunications	120	110	75.8%	73.6%	65.8%	58.2%	10.0%	15.5%	11.7%	14.5%	12.5%	11.8%	6.7%	8.2%	5.8%	3.6%
20. Graphics software (e.g., MacDraw)	120	110	68.3%	65.5%	55.0%	51.8%	13.3%	13.6%	15.8%	17.3%	15.9%	17.3%	9.2%	10.0%	6.7%	7.3%
21. Scanners	119	110	80.7%	78.2%	70.6%	60.0%	10.1%	18.2%	15.1%	10.9%	4.2%	10.9%	3.4%	8.2%	0.8%	2.7%
22. Laser discs	119	110	82.3%	73.6%	68.9%	57.3%	13.4%	16.4%	12.6%	10.9%	5.0%	15.5%	2.5%	12.7%	2.5%	2.7%
23. CD-ROM	120	110	79.2%	77.3%	69.2%	59.1%	10.0%	18.2%	14.2%	10.9%	6.7%	11.8%	2.5%	7.3%	4.2%	4.5%
24. Authoring software (e.g., Hypercard or Linkway)	119	109	83.2%	85.3%	75.6%	70.6%	7.6%	14.7%	11.8%	10.1%	5.0%	4.6%	5.0%	1.8%	0.0%	2.8%
25. Vidoe Camera and/or editing equipment.	120	109	70.9%	72.5%	56.7%	57.8%	14.2%	14.7%	20.0%	13.8%	9.1%	13.8%	3.3%	5.5%	5.8%	8.3%
26. Programming	119	108	84.8%	83.3%	67.2%	66.7%	17.6%	16.7%	10.9%	11.1%	4.2%	5.6%	3.4%	1.9%	0.8%	3.7%
27. VCR	120	109	28.3%	22.9%	15.0%	15.6%	13.3%	7.3%	29.2%	22.9%	42.5%	54.1%	23.3%	33.9%	19.2%	20.2%

Yes, Sometimes, No Items

Survey Item	Number of Respondents		Yes		Sometimes		No	
	Pre	Post	Pre	Post	Pre	Post	Pre	Post
28. I have access to a computer for classroom instruction.	119	109	52.1%	50.5%	15.1%	21.1%	32.8%	28.4%
29. I have access to a computer lab.	119	110	34.5%	54.5%	37.8%	32.7%	27.7%	12.7%
30. I have access to a computer for teacher tasks.	118	110	67.8%	72.7%	25.4%	21.8%	6.8%	5.5%
31. Every teacher should be provided with a personal computer.	119	110	85.7%	91.8%	10.1%	4.5%	4.2%	3.6%
32. I receive technical assistance at school when I need it.	119	109	56.3%	53.2%	31.9%	37.6%	11.8%	9.2%

Items on which teachers estimated the percentage of time used for each teaching activity.

Survey Item	Number of Respondents		Less than 50%		0%		1-25%		26-50%		More than 50%		51-75%		76-100%	
Estimate the percent of instructional time you use for each teaching activity.	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post
33. Lecture	119	107	93.9%	93.5%	11.2%	4.7%	65.5%	63.6%	17.2%	25.2%	0.0%	6.5%	0.0%	5.6%	0.0%	0.9%
34. Class discussion	116	107	91.5%	87.8%	7.8%	3.7%	56.0%	59.8%	27.7	24.3%	8.6%	12.2%	6.9%	10.3%	1.7%	1.9%
35. Student questions/answers	116	106	88.8%	89.6%	4.3%	1.9%	63.8%	59.4%	20.7%	28.3%	11.2%	10.4%	6.9%	8.5%	4.3%	1.9%
36. Inquiry or guided discovery	114	105	85.1%	85.7%	4.4%	6.7%	61.4%	59.0%	19.3%	20.0%	14.9%	14.3%	9.6%	9.5%	5.3%	4.8%
37. Cooperative learning groups	115	100	93.6%	91.0%	14.7%	15.0%	62.4%	63.0%	16.5%	13.0%	6.4%	9.0%	4.6%	6.0%	1.8%	3.0%
38. Other	33	21	90.9%	85.8%	51.5%	52.4%	24.2%	28.6%	15.2%	4.8%	9.1%	14.3%	6.1%	4.8%	3.0%	9.5%

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